



December 06, 2016

Meagan E. Ormand Golder Associates Inc. 2108 W. Laburnum Ave. Suite 200 Richmond, VA 23227

RE: Project: Bremo Monthly Process Pace Project No.: 92321819

# Dear Meagan Ormand:

Enclosed are the analytical results for sample(s) received by the laboratory on December 05, 2016. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Nicole Gasiorowski

Micolo Lassorouske

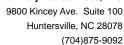
nicole.gasiorowski@pacelabs.com

**Project Manager** 

**Enclosures** 

cc: Ron DiFrancesco, Golder Associates Inc.
 Arielle Green, Golder Associates Inc.
 Martha Smith, Golder Associates Inc.
 Mike Williams, Golder Associates Inc







### **CERTIFICATIONS**

Project: Bremo Monthly Process

Pace Project No.: 92321819

**Ormond Beach Certification IDs** 

8 East Tower Circle, Ormond Beach, FL 32174

Alabama Certification #: 41320 Connecticut Certification #: PH-0216

Delaware Certification: FL NELAC Reciprocity

Florida Certification #: E83079 Georgia Certification #: 955

Guam Certification: FL NELAC Reciprocity Hawaii Certification: FL NELAC Reciprocity

Illinois Certification #: 200068

Indiana Certification: FL NELAC Reciprocity

Kansas Certification #: E-10383

Louisiana Certification #: FL NELAC Reciprocity Louisiana Environmental Certificate #: 05007

Maryland Certification: #346

Michigan Certification #: 9911

Mississippi Certification: FL NELAC Reciprocity

Missouri Certification #: 236 Montana Certification #: Cert 0074 Nebraska Certification: NE-OS-28-14

Nevada Certification: FL NELAC Reciprocity

New York Certification #: 11608

North Carolina Environmental Certificate #: 667

North Carolina Certification #: 12710
Oklahoma Certification #: D9947
Pennsylvania Certification #: 68-00547
Puerto Rico Certification #: FL01264
South Carolina Certification: #96042001
Tennessee Certification #: TN02974
Texas Certification: FL NELAC Reciprocity

US Virgin Islands Certification: FL NELAC Reciprocity Virginia Environmental Certification #: 460165

Wyoming Certification: FL NELAC Reciprocity

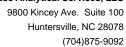
West Virginia Certification #: 9962C Wisconsin Certification #: 399079670

Wyoming (EPA Region 8): FL NELAC Reciprocity

**Eden Certification IDs** 

205 East Meadow Road Suite A, Eden, NC 27288 North Carolina Drinking Water Certification #: 37738 North Carolina Wastewater Certification #: 633 Virginia/VELAP Certification #: 460025

# **REPORT OF LABORATORY ANALYSIS**





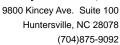
# **SAMPLE ANALYTE COUNT**

Project: Bremo Monthly Process

Pace Project No.: 92321819

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
92321819001	T3-161204-1150-S3	ASTM D4282-02	KCE	1	PASI-E
		EPA 200.7	RVK	8	PASI-O

# **REPORT OF LABORATORY ANALYSIS**





### **PROJECT NARRATIVE**

Project: Bremo Monthly Process

Pace Project No.: 92321819

Method: ASTM D4282-02 Description: Cyanide, Free

Client: Golder\_Dominion\_Bremo
Date: December 06, 2016

### **General Information:**

1 sample was analyzed for ASTM D4282-02. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

# **Additional Comments:**



9800 Kincey Ave. Suite 100 Huntersville, NC 28078 (704)875-9092

### **PROJECT NARRATIVE**

Project: Bremo Monthly Process

Pace Project No.: 92321819

Method: EPA 200.7

Description: 200.7 MET ICP

Client: Golder\_Dominion\_Bremo
Date: December 06, 2016

### **General Information:**

1 sample was analyzed for EPA 200.7. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

### Sample Preparation:

The samples were prepared in accordance with EPA 200.7 with any exceptions noted below.

### Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

### **Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

### **Laboratory Control Spike:**

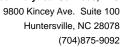
All laboratory control spike compounds were within QC limits with any exceptions noted below.

## Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

### **Additional Comments:**

This data package has been reviewed for quality and completeness and is approved for release.





# **ANALYTICAL RESULTS**

Project: Bremo Monthly Process

Pace Project No.: 92321819

Date: 12/06/2016 07:11 PM

Sample: T3-161204-1150-S3	Lab ID: 9232	21819001	Collected: 12/04/1	16 11:50	Received: 12	2/05/16 14:20	Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Cyanide, Free	Analytical Meth	od: ASTM	D4282-02					
Cyanide, Free	ND	mg/L	0.050	1		12/06/16 10:3	0 57-12-5	
200.7 MET ICP	Analytical Meth	od: EPA 20	0.7 Preparation Met	thod: EF	PA 200.7			
Aluminum	255	ug/L	100	1	12/06/16 12:37	12/06/16 16:2	4 7429-90-5	
Barium	300	ug/L	10.0	1	12/06/16 12:37	12/06/16 16:2	4 7440-39-3	
Beryllium	ND	ug/L	1.0	1	12/06/16 12:37	12/06/16 16:2	4 7440-41-7	
Boron	1760	ug/L	50.0	1	12/06/16 12:37	12/06/16 16:2	4 7440-42-8	
Cobalt	ND	ug/L	10.0	1	12/06/16 12:37	12/06/16 16:2	4 7440-48-4	
Iron	ND	ug/L	250	1	12/06/16 12:37	12/06/16 16:2	4 7439-89-6	
Molybdenum	188	ug/L	10.0	1	12/06/16 12:37	12/06/16 16:2	4 7439-98-7	
Vanadium	ND	ug/L	10.0	1	12/06/16 12:37	12/06/16 16:2	4 7440-62-2	



### **QUALITY CONTROL DATA**

Project: Bremo Monthly Process

Pace Project No.: 92321819

Date: 12/06/2016 07:11 PM

QC Batch: 339594 Analysis Method: ASTM D4282-02

QC Batch Method: ASTM D4282-02 Analysis Description: ASTM D4282 Free Cyanide

Associated Lab Samples: 92321819001

METHOD BLANK: 1883248 Matrix: Water

Associated Lab Samples: 92321819001

Parameter Units Result Limit Analyzed Qualifiers

Cyanide, Free mg/L ND 0.050 12/06/16 10:30

LABORATORY CONTROL SAMPLE: 1883249

Spike LCS LCS % Rec Parameter Units Conc. Result % Rec Limits Qualifiers Cyanide, Free mg/L 0.10 101 90-110

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1883250 1883251

MS MSD 92321816001 Spike Spike MS MSD MS MSD % Rec Parameter Units Result Conc. Conc. Result Result % Rec % Rec Limits RPD Qual Cyanide, Free ND 0.098 90-110 mg/L .1 .1 0.10 92 96 3

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

# **REPORT OF LABORATORY ANALYSIS**



### **QUALITY CONTROL DATA**

Project: Bremo Monthly Process

Pace Project No.: 92321819

Date: 12/06/2016 07:11 PM

QC Batch: 336641 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 MET

Associated Lab Samples: 92321819001

METHOD BLANK: 1802996 Matrix: Water

Associated Lab Samples: 92321819001

		Blank	Reporting		
Parameter	Units	Result	Limit	Analyzed	Qualifiers
Aluminum	ug/L	ND	100	12/06/16 16:00	
Barium	ug/L	ND	10.0	12/06/16 16:00	
Beryllium	ug/L	ND	1.0	12/06/16 16:00	
Boron	ug/L	ND	50.0	12/06/16 16:00	
Cobalt	ug/L	ND	10.0	12/06/16 16:00	
Iron	ug/L	ND	250	12/06/16 16:00	
Molybdenum	ug/L	ND	10.0	12/06/16 16:00	
Vanadium	ug/L	ND	10.0	12/06/16 16:00	

LABORATORY CONTROL SAMPLE:	1802997					
		Spike	LCS	LCS	% Rec	
Parameter	Units	Conc.	Result	% Rec	Limits	Qualifiers
Aluminum	ug/L	2500	2510	100	85-115	
Barium	ug/L	250	259	104	85-115	
Beryllium	ug/L	25	25.8	103	85-115	
Boron	ug/L	2500	2550	102	85-115	
Cobalt	ug/L	250	252	101	85-115	
Iron	ug/L	2500	2610	104	85-115	
Molybdenum	ug/L	250	250	100	85-115	
Vanadium	ug/L	250	254	101	85-115	

MATRIX SPIKE & MATRIX SPI	KE DUPLICAT	E: 18029	98		1802999						
			MS	MSD							
	923	321816001	Spike	Spike	MS	MSD	MS	MSD	% Rec		
Parameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	Qual
Aluminum	ug/L	ND	2500	2500	2630	2640	102	103	70-130		
Barium	ug/L	339	250	250	608	599	108	104	70-130	1	
Beryllium	ug/L	ND	25	25	25.6	26.4	102	105	70-130	3	
Boron	ug/L	1900	2500	2500	4480	4580	103	107	70-130	2	
Cobalt	ug/L	ND	250	250	248	251	99	100	70-130	1	
Iron	ug/L	ND	2500	2500	2690	2690	105	105	70-130	0	
Molybdenum	ug/L	239	250	250	488	489	100	100	70-130	0	
Vanadium	ug/L	ND	250	250	261	263	102	103	70-130	1	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

# **REPORT OF LABORATORY ANALYSIS**

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### **QUALIFIERS**

Project: Bremo Monthly Process

Pace Project No.: 92321819

### **DEFINITIONS**

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

**DUP - Sample Duplicate** 

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

Acid preservation may not be appropriate for 2 Chloroethylvinyl ether.

A separate vial preserved to a pH of 4-5 is recommended in SW846 Chapter 4 for the analysis of Acrolein and Acrylonitrile by EPA Method 8260.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

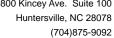
TNI - The NELAC Institute.

# **LABORATORIES**

Date: 12/06/2016 07:11 PM

PASI-E Pace Analytical Services - Eden

PASI-O Pace Analytical Services - Ormond Beach





# **QUALITY CONTROL DATA CROSS REFERENCE TABLE**

Project: Bremo Monthly Process

Pace Project No.: 92321819

Date: 12/06/2016 07:11 PM

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92321819001	T3-161204-1150-S3	ASTM D4282-02	339594		· · · · · · · · · · · · · · · · · · ·
92321819001	T3-161204-1150-S3	EPA 200.7	336641	EPA 200.7	336709



# Document Name: Sample Condition Upon Receipt(SCUR)

Document No.: F-MEC-CS-009-Rev.03 Document Revised: May 24, 2016 Page 1 of 2

Issuing Authority:

Pace Mechanicsville Quality Office

Page 7 of 7 for Internal I ice ONI V

Sample Condition Upon Client Name:				W0#:92321819
Becelpt (TD) (ACL)	Paler	AC:		Project #:
Courier: Fed Ex UPS	US	PS PS		Client
Commercial Pace	Ott	ner:	_	92321819
Custody Seal Present? Yes No Sea	als Intact?	□ Y	es [	□No
				Date/Initials Person Examining Contents: 12 5 10
Packing Material: Bubble Wrap  Thermometer:	Bubble Bags	□N	1	Other: RSB
☑ RMD001 □	Туре о	f Ice:	₩et	Blue None Samples on ice, cooling process has begun
Correction Factor: 0.0°C Cooler Temp Corrected (	c): 2,5	)		Biological Tissue Frozen? Yes No N/A
Temp should be above freezing to 6°C USDA Regulated Soil ( \sum N/A, water sample)				
Did samples originate in a quarantine zone within the Unit	ed States: CA	NY, or	SC (check	maps)? Did samples originate from a foreign source (internationally,
Yes No				including Hawaii and Puerto Rico)? Yes No
				Comments/Discrepancy:
Chain of Custody Present?	Yes	□No	□n/a	1.
Samples Arrived within Hold Time?	✓Yes	No	□N/A	2.
Short Hold Time Analysis (<72 hr.)?	☐Yes	ŪN₀	□N/A	3.
Rush Turn Around Time Requested?	VYes	□No	□N/A	4.
Sufficient Volume?	Yes	□No	□N/A	5.
Correct Containers Used?	√,Yes	□No	□n/a	6.
-Pace Containers Used?	√yes	□No	□n/A	
Containers Intact?	Yes	□No	□n/a	7.
Samples Field Filtered?	□yes	□No	VIN/A	8. Note if sediment is visible in the dissolved container
Sample Labels Match COC?	Yes	□No	□N/A	9.
-Includes Date/Time/ID/Analysis Matrix:	N			
All containers needing acid/base preservation have been				10. HNG phs2
checked? All containers needing preservation are found to be in	Yes	□No	□N/A	на рн<2
compliance with EPA recommendation?	1			H2504 pHc2
(HNO <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> , HCl<2; NaOH >9 Sulfide, NaOH>12 Cyanide)	Yes	□No	□N/A	NaOH pHb12
Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC,LLHg	□Yes	□No	IJN/A	NaOH/ZnOAc pHb9
Samples checked for dechlorination?	□Yes	□No	N/A	11.
Headspace in VOA Vials (>5-6mm)?	Yes	□No	N/A	12.
Trip Blank Present?	Yes	□No	N/A	13.
Trip Blank Custody Seals Present?	Yes	□No	N/A	9
Pace Trip Blank Lot # (if purchased):	_			
CUENT NOTIFICATION/RESOLUTION				Field Data Required? Yes No
Passan Contacted:				Data (Time)
Person Contacted: Comments/Sample Discrepancy:				Date/Time:
Project Manager SCURF Review:	r,	m 6		Date:
Project Manager SRF Review:	7)	me	7	Date: 12 6 110
				of this form will be sent to the North Carolina DEHNR Certification Office (i.e.

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							, e		ır Unp						JH4CI					I: N .IEN		92_	Gold	Due derf		te:	12/	08/16
Item#	BP4U-125 mL Plastic Unp	BP3U-250 mL Plastic Unp	BP2U-500 mL Plastic Unp	BP1U-1 liter Plastic Unp	BP3S-250 mL Plastic H2SO4	BP3N-250 mL plastic HNO3	BP3Z-250 mL Plastic ZN Acetate	BP3C-250 mL Plastic NaOH	WGFU-Wide-mouthed Glass Jar Unp	AG1U-1 liter Amber Unp	AG1H-1 liter Amber HCl	AG3U-250 mL Amber Unp	AG1S-1 liter Amber H2SO4	AG3S-250 mL Amber H2504	AG3A(DG3A)-250 mL Amber NH4Cl	DG9H-40 mL VOA HCI	VG9T-40 mt VOA Na25203	VG9U-40 mL VOA Unp	DG9P-40 mL VOA H3PO4	VOAK (6 vials per kit)-5035	V/GK (3 vials per kit)-VPH/	SPST-125 mL Sterile Plastic	SP2T-250 mL Sterile Plastic	BP3A-250 mL Plastic (NH2).	Cubitalner	VSGU-20 mL Scintillation vi:	GN	
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# CHAIN-OF-CUSTODY / Analytical Request Document The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

					All analy:		12	11	10	9	æ	7	6	<b>5</b> 1	4	u	2	1	ITEM#			Requeste	Phone: 8	Email To:		Address:	Company:	Section /
					All analyses to be performed under Golder-Pace MSA dated 12/19/2008	ADDITIONAL COMMENTS												T3-161264-1150-55	E UNIQUE	Section D Valid Matrix Codes Required Client Information MATRIX CODE		Requested Due Date/TAT: 24400R 23. D. 7	804-551-0129 Fax: 804-358-2900	Mormand@golder.com	Richmond, VA 23227	2108 W Laburnum Ave, Ste 200	Golder Associates	Section A  Becuired Client Information
			-	2																		Project Number:	Project Name:	Purchase Order No.:	Z)	Сору То: М	Report To: Mormand@golder.com	Section B Required Project Information:
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